

Private Events: Do They Belong in a Science of Human Behavior?

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The role of thinking, feeling, and other private events has received a great deal of attention in mainstream psychology but has been virtually ignored in behavior analysis until recently. This paper introduces a series of papers from a symposium that explored the roles of private events in a science of human behavior. We briefly explore the role private events are assigned in several behavioral orientations. Next, we discuss several positions on how private events might be conceptualized within a behavior-analytic framework. We conclude by noting that the dearth of research and conceptualizations about private events unnecessarily limits the theoretical or conceptual understanding on which applied behavior analysts base their work. With this paper and the papers that follow, we hope to spark research, discussion, and yes, thinking, about the roles of thinking and feeling.

Key words: private events, behavior analysis, cognition

Few people would argue that the events to which we behavior analysts refer as private—thoughts, feelings, and physiological responses—do not occur. Although private events generally are accepted as occurring, their place within a natural science of human behavior is not well established. In fact, there seem to be three points of debate surrounding private events. First, should private events be included in a science of human behavior, at least on a philosophical or theoretical level? Second, do these private events affect our overt behavior in any significant way? Third, should the analysis and attempted modification of private events be included in the applied part of our science? In this paper we discuss these three issues. We do not presume to provide definitive answers to these questions, but rather to provoke behavior analysts to investigate, interpret, and theorize more about thinking and feeling. This is accomplished by first reviewing how different schools of be-

haviorism deal with private events. Second, we describe how behavior analysis has attempted to address these forms of behavior. Finally, we explore several possible approaches to conceptualizing the role of private events in a science of human behavior in an attempt to stimulate greater endeavors in this area.

Throughout this article the terms *thoughts* and *feelings* are used as English language names for events that are at least partly unobservable by the usual kinds of interactions between people. In other words, they are socially constructed terms used to categorize certain events that occur within a person (e.g., thinking typically refers to privately occurring verbal behavior or images). As such, the terms should be considered separate from the actual events or phenomena. We certainly do not wish to imply that they are necessarily best considered as two distinct classes of events or, especially, that feelings are best considered as falling into the socially defined classes named by the popular terms for various emotions such as *remorse*, *guilt*, *anger*, *resentment*, or *joy*. Any classification of private events should be based on the best natural science evidence available.

This series of papers is based on a symposium presented at the annual convention of the Association for Behavior Analysis, Chicago (Hawkins, 1997a).

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What Sort of Behaviorist Are You, Anyway?

The question of what constitutes an appropriate subject matter for the field of psychology has been, and continues to be, debated. Is psychology the study of consciousness, the mind, the self, or behavior? Behaviorally oriented psychologists often argue that psychology is the study of behavior in its relation to environment and physiology; however, the question remains "What is behavior?" Does behavior include only events that are observable by more than one individual or does it include other events as well? That is, if psychology is the study of behavior, are those events that occur privately and only at the neurological level to be considered behavior, despite the absence of muscular movement? This topic is considered by focusing briefly on three types of behaviorism: methodological behaviorism, cognitive behaviorism, and radical behaviorism.¹

Methodological behaviorism defines psychology as the study of behaviors that are observable by others (Leigland, 1992; Skinner, 1953, 1974). What the originator of methodological behaviorism, John B. Watson, sought was "A . . . lifting of psychology out of the mire of introspection and bringing it closer to the natural sciences" (Chiesa, 1994, p. 185). Thus, Watson proposed moving away from a focus on inferences concerning mental processes—the approach that largely dominated the field of psychology at that time—toward a focus on observable responses and the role of environmental influences in determining those responses. From a methodological perspective,

then, an understanding of private events remains largely unnecessary because they are not observable by people other than those who emit them. This is not a denial of the occurrence of private events, but rather a practical setting of limits on the domain of study.

A second type of behaviorism, cognitive behaviorism, has many similarities to methodological behaviorism. For example, both are largely deductive sciences, and both primarily use inferential statistics about the behavior of groups to test scientific hypotheses (Leigland, 1992). In contrast to methodological behaviorism, however, cognitive behaviorism does allow the study of unobservable events and processes. In fact, most cognitive behavioral psychologists seem to agree that cognitive events not only exist, but that they mediate overt behavior and that most learning is cognitively mediated (Bandura, 1977; Mahoney & Arndoff, 1978; Weiss & Weiss, 1989). To illustrate, researchers (e.g., Ingram & Scott, 1990; Mahoney, 1977) have suggested that people respond to cognitive representations of their environment rather than to the actual environment. Cognitive processes are said to play a central role in producing, predicting, and understanding behavior (Kendall & Hollon, 1979). Further, cognitive events and processes include not only thinking and feeling but also hypothetical structures such as schemata, memories, and information processing networks (Foa & Kozak, 1986).

A third type of behaviorism, radical behaviorism or behavior analysis, differs from other behaviorisms in several ways, including the sorts of questions asked, the methodology, and the role of the environment (for accounts of the distinction see Baum, 1994; Catania, 1993; Chiesa, 1994; Dougher, 1993, 1995; Leigland, 1992; Skinner, 1953, 1974). Radical behaviorism also differs in the way that unobservable events—private events—are viewed. Specifically, radical behaviorism is based on a monistic view of behavior; no distinc-

¹ We have not included Staats' (1994, 1996) psychological behaviorism (earlier called paradigmatic behaviorism and, still earlier, social behaviorism) as a fourth type of behaviorism because we do not see it as fundamentally different (Hawkins, Anderson, & Eifert, 1998). However, it does include several aspects that make it a broader perspective than contemporary behavior analysis, especially for dealing with complex human behavior, and it does include private events.

tion is made between external physical responses and those responses that occur within the body. Instead, all responses, public or private, are viewed as natural, physical events, many of which are observable, even if only by the person emitting them (Anderson, Hawkins, & Scotti, 1997; Baum & Heath, 1992). In contrast to methodological behaviorism, radical behaviorism does not require agreement between two or more people that an event has occurred. Further, in contrast to cognitive behaviorism, radical behaviorism includes only those private events that are observable to the person experiencing them, including thoughts and other neurological events, such as the beating of the heart. Such events are distinguishable from the hypothesized structures and processes of the nonphysical world that have been called mentalisms (Skinner, 1953, 1974). Mentalisms are not directly observable even by one individual, but rather are inferred from the occurrence (or nonoccurrence) of behavior. Private responses would thus include such events as verbal thoughts, private perceptions (e.g., visual images, auditory images), and the private aspects of emotional responding (i.e., physiological arousal). They would not include hypothetical structures such as a fear network within which phobic stimuli and responses are organized.

The Roles of Private Events in Behavior Analysis

Based on the writings of Skinner (1953, 1974, 1977) and other behavior analysts (e.g., Baum, 1994; Dougher, 1993; Hayes & Brownstein, 1986; Moore, 1980), it seems clear that the roles played by private events should be included in a comprehensive science of behavior, especially human behavior. Unfortunately, there is little discussion to be found in the scientific literature on behavior analysis regarding what those roles might be. Although Skinner (e.g., 1945, 1953, 1963, 1974, 1977) offered several interpretations

regarding the roles of private events, insufficient work has been done to advance our understanding beyond what he offered (Anderson et al., 1997). Behavior analysts almost totally ignore all private events, not even differentiating between private responses and private stimuli. To illustrate, we perused the subject indexes of five recent texts on general principles of behavior—Cattania (1998), Donahoe and Palmer (1994), Grant and Evans (1994), Malott, Whaley, and Malott (1997), and Pierce and Epling (1995)—searching for references to either thinking or emoting. Of these texts, only the first offered any discussion of thinking, although some of the others did have brief passages about private or covert behavior or cognition. Some behavior analysts might claim that this is because these texts deal only with basic principles, yet it seems a serious limitation if even a basic text has virtually nothing to say about the profoundly important topic of human thinking.

There is one group of behavioral texts that is almost exclusively about human behavior: those on behavior modification and applied behavior analysis. We perused five texts on this topic as well: Chance (1998), Kazdin (1994), Martin and Pear (1996), Miltenberger (1997), and Sarafino (1996). Although only Chance and Martin and Pear had an index entry for thinking, we found that all but Chance presented cognitive behavior modification procedures at some length. By comparing texts focusing on basic principles and those focusing on the application of those principles, we see a clear gap in the scientific approach to private events. Applied behavior analysis appears to recognize the need for technologies for modifying certain private responses, thus suggesting they play an important part in the everyday lives of humans, whereas the basic portion of the science appears to be largely ignoring such events.

Emotion, and particularly anxiety, is a very popular topic in clinical psychology. But how much coverage does

emotion get in behavior analysis? Again, perusal of the same five texts on behavior principles revealed that only Catania (1998) contains anything substantial on emotion, and even his coverage is quite limited. Perusal of the same five books on behavior modification, which are important for budding clinicians to study, reveals that emotion is given approximately zero to six pages of coverage, the most being in Martin and Pear (1996). Does this dearth of information on emotion and modeling the ways to talk about it mean that behavior analysts do not consider emotional behavior important? Is it because the topic is too difficult for behavior analysis at present? Is it because behavior analysts generally take little interest in respondent relations (which certainly are involved in emotional behavior) or is there some other reason?

Regardless of the reasons, it seems to us that not only is behavior analysis neglecting important areas of study and theory but also that such neglect makes behavior analysis seem to the rest of the world like a specialized and limited paradigm that cannot deal with some of the major phenomena in human behavior. Further, it is not obvious to even seasoned behavior analysts how to describe relations between private behaviors and overt behaviors from a behavior-analytic perspective. For example, Chance (1998) states that "thoughts and feelings are behavior, not environmental events" (p. 14); yet each of us has had the experience of privately planning some action before executing it. Is that private behavior merely epiphenomenon or does it provide stimuli that serve valuable functions in human affairs? In contrast to the failure of most authors to specify a role for thinking and feeling, Johnston and Pennypacker (1993) say that "the environment for a particular behavior can include not only the organism's external features but physical events inside its skin" (p. 28). However, the general confusion in behavior analysis

about the roles of private events leads to continued avoidance of the topic.

The field's silence about private events unnecessarily limits the theoretical or conceptual understanding on which applied behavior analysts base their work. Further, a large gap exists in behavior analysis that is obvious to other behavioral scientists, to our students, and to our potential students, giving them the unfortunate impression that behavior analysis is unwilling, or worse, unable to deal with certain important and interesting behavioral phenomena. This may have led many would-be behavior analysts to join the "cognitive revolution" in search of a means of addressing the important, and real, phenomena of human thinking and feeling. If behavior analysts continue to be negligent in efforts toward addressing issues related to private events, this trend is likely to continue.

Of course, behavior analysts could do what clinicians of other persuasions have done for decades: invent profound-sounding theories about the role of private behaviors, theories that are without empirical basis and are not integrated with the rest of the science of behavior. That approach would be unwise; behavior analysis has remained a remarkably integrated science and technology thus far, and we see great advantage in maintaining that integrity (Hawkins, 1997b). Instead, we argue that theoretical and empirical work is needed that results in an integration of private events within our paradigm.

Private Events in an Applied Science

Perhaps out of professional necessity, some applied behavior analysts (e.g., Dougher, 1993; Dougher & Hackbert, 1994; Hayes & Wilson, 1993, 1994; Kohlenberg & Tsai, 1991) are beginning to investigate the role of private events in a science of behavior, in particular focusing on how private events might influence overt behavior and how this might be accounted for and utilized in therapy. Their work is to be commended, but much more is

needed. Specifically, work should focus on delineating the relations between private responses and overt responses and on how private responses and their stimulus properties might be dealt with in applied work. Consider two examples.

Sports psychologists often instruct athletes to visualize a good performance before executing the performance overtly. Evidence suggests that this prior visualization improves the overt performance of the athletes (for a review, see Suinn, 1993). How does the instruction to visualize have such an effect? Although it cannot be proven with present technology, it seems likely that the athletes emit private visualizing responses that exert some influence over their subsequent overt responses. Of course, only the external events of the psychologist's behavior (instructing the athletes as to how to visualize) can be confirmed as antecedents, but it seems credible that those instructions have their effect only if the athlete actually engages in the private visualizing behavior. The question that remains to be answered in such situations is whether the inclusion of private behavior, in this case visualization, in the analysis of the relation between environmental variables (e.g., the basketball court, other players, sensation of the ball in hand) and behavior (e.g., shooting the foul shot) is critical to the effective prediction and control of the behavior of interest (e.g., making successful foul shots). If successful prediction and control occur without inclusion of private responses, a more parsimonious account of environment-behavior relations is made if they are excluded. If, however, we cannot effectively predict and control behavior without including private events in some way, then we must account for them. Unfortunately, behavior analysis has not yet arrived at a consensus as to the best way to include (or a rationale for excluding) private events in the analysis of behavior because private behaviors are so often ignored in anal-

yses of environment-behavior interactions.

Consider a clinical example. Suppose that a husband and wife are coming to a marital therapist. The clinician's assessment suggests that the wife needs to speak her opinions and preferences more often and more persuasively. First, notice that we are not saying that the lack of assertiveness in her behavior is caused by something she has been thinking or even assuming, or by a schema regarding herself and her role in the world, as is commonly done in cognitive therapy and cognitive-behavior therapy. We do not have knowledge of such things, and it is unnecessary and nonparsimonious to assume their occurrence. We simply believe that there are numerous situations weekly in which the wife's interests would be better served if she spoke up, and that, in the long run, the husband's interests might be better served as well. Now suppose that one thing the clinician teaches the woman is to privately rehearse what she will say before she says it, so that she can not only practice saying things in promising ways but can also sense (as private stimuli) the likely consequences of alternative things to say and ways to say them (cf. Skinner, 1974, p. 103). To us this seems to be a very sensible intervention for a clinical behavior analyst, yet behavior analysis contains so little literature about the roles of such private behavior that it is difficult to describe such an intervention or its effect to fellow behavior analysts.

Some Roles That Private Events May Play

In considering the roles of private responses in a science of human behavior, at least three alternatives are evident. First, private responses sometimes might be best viewed as merely collateral to overt behavior and of no functional significance. Second, private responses, as stimuli, sometimes may be best viewed as causal events, as discriminative or motivative antecedents.

Third, as a middle ground, private responses might be viewed most usefully as stimuli that, at times, are functionally related to the occurrence of overt behavior. Let us examine the hypothesis that private responses, although they certainly occur, simply accompany overt behavior and have no functional role. Returning to the example of the woman who was to privately rehearse what she wanted to say before acting overtly, one might argue that the overt stimuli of the therapist's instructions set the occasion for both her talking to her husband and her private rehearsal, but that the rehearsal had no effect on her overt talk. Although the private behavior occurred slightly before the overt behavior, it did not affect the overt behavior in any way. If one subscribes to this perspective (which certainly would be compatible with a methodological behavioral position), it would not be necessary to spend much time investigating the status or role of private events; they are simply dependent variables and have no other status or role. This is the position that behavior analysts often appear to take, although it seems that the position fails to explain why we think at all. It seems unlikely that humans would acquire private behavior at all if it were not functional. Also, because pausing to think not only expends effort but also produces a delay in the reinforcers for overt behavior, thinking would not be maintained even if it were established temporarily. Thus, it seems likely that thinking does, at least some of the time, play an important role in the chain of behaviors.

The second hypothesis, that private events are a primary cause of overt behavior, poses other problems. In the example of the woman who privately rehearses what she wants to say, a person arguing from this position would say that the woman's private rehearsal was the proximal cause of her talking to her husband more effectively than if she had not privately rehearsed. This seems to be a very popular perspective in psychology, but, from a behavior-analytic

perspective, it is problematic because it does not identify the environmental variables of which the overt behavior is a function. Specifically, in behavior analysis, an explanation is useful to the extent that it allows one to work successfully with the phenomena of interest. In other words, "truth" is equated with explanation that can lead to effective action (Baum, 1994; Moore, 1992). Thus, although the above explanation may be partly true, it is problematic because it does not specify the external, measurable, and, perhaps, manipulable environmental variables that affect both the woman's overt and covert behavior. Perhaps a more parsimonious explanation involves simply appealing to the verbal instructions provided by the clinician as the causal variables involved in the improvement of her communication. However, because this explanation ignores the issue of whether private events play a role, sole reliance on such an explanation is more consistent with a methodological behavioral approach than with a behavior-analytic one.

The third alternative is to consider private responses as dependent variables that, although not adequate by themselves as causes, often do have an effect on overt responses. We "hear" ourselves talk silently, we "see" images that we are privately visualizing, and so on. It seems likely that these private responses do, at times, affect overt behavior in important ways. In fact, if private behavior were not functionally important, then it seems unlikely that humans would acquire and continue to emit it. The question, then, is what role do these private responses play? It seems that there are at least two possible answers to this question. First, private responses might exert discriminative stimulus control over subsequent responses. Second, private responses might best be accounted for as contingency-specifying stimuli. These possible explanations are briefly explored next.

Private events as discriminative

stimuli. Although private events (as dependent variables) cannot be treated as the sole causes of other behavior, as seems common practice in cognitive therapy, a private event may often set the occasion for another response. This response could be private or overt, but to simplify discussion we will address only an overt response. Such control could develop by at least two means: (a) through direct training during which a particular overt response was more likely to be reinforced in the presence (but not the absence) of that private response, or (b) as a result of the private response participating in an equivalence relation with an external stimulus that exerted discriminative control over the overt response (cf. Hayes & Hayes, 1992; Hayes & Wilson, 1993; Sidman, 1990).² In fact, DeGrandpre, Bickel, and Higgins (1992) established interoceptive stimuli, produced via drug administration, as members of an equivalence class that also included exteroceptive stimuli.

Using the example of the woman who privately rehearses what she might say to her husband, one might argue that these private responses exerted stimulus control over her overt behavior. In behavior analysis (but not cognitive psychology), such an explanation is incomplete unless it also describes the relation between the therapist's instructions and the woman's private behavior and probably some direct influence of the instructions on her overt behavior as well; however, it should also be recognized that an explanation in terms of only the overt instructions appears to be similarly incomplete. Of course, the influence of the woman's private behavior on her overt behavior would be maintained

only if the environment provides adequate reinforcers for that relation. Also, it might be useful to include, in the explanation, the learning history that established instructions as controlling stimuli.

Although several behavior analysts (e.g., Anderson et al., 1997; Forsyth, Lejuez, Hawkins, & Eifert, 1996; Moore, 1980, 1992) have suggested that private events might acquire discriminative control over other responses, this explanation is problematic for some examples (e.g., self-instructions) when one considers the definition of a discriminative stimulus. A discriminative stimulus is defined as an antecedent stimulus that sets the occasion for a response because in the past, reinforcement was likely to occur in the presence, but not in the absence, of that stimulus (Michael, 1980; Sulzer-Azaroff & Mayer, 1977). Returning to the example of the woman rehearsing what she might say, if private rehearsing is to be considered a discriminative stimulus, then it must signal the availability of reinforcement. That is, reinforcement must be available when rehearsal occurs, but not when it does not. It may be the case that if the woman rehearses she is more likely to emit a response that results in reinforcement but, and this is a critical point, reinforcement is available for emitting that response whether she rehearses or not. That is, if the woman did not rehearse, and happened to emit the "correct" response anyway, that response would still be reinforced, even in the absence of the private rehearsal. Thus, conceiving of private events as some sort of discriminative stimuli does not seem quite accurate for this kind of example.

Private events as contingency-specifying stimuli. A second way that the impact of private events on overt behavior might be accounted for is by considering them as contingency-specifying stimuli. Contingency-specifying stimuli (CSS), also called rules, are stimuli that affect the function of other stimuli, and do so by describing at least two components of a contingency

² We leave unexplored here the issue of whether the stimulus properties of private events can also function as consequences, reinforcing or punishing overt behavior. Their maintenance of such functions would no doubt require that they be "backed up" by overt stimuli that have such functions, but that does not seem to be an unlikely contingency.

(Blakely & Schlinger, 1987; Schlinger & Blakely, 1987). More specifically, a CSS might describe the relation among antecedent stimuli, behavior, and consequences; between antecedent stimuli and behavior; between behavior and consequences; or between two or more stimuli.

Schlinger and Blakely (1987) suggest that CSS alter the function of other stimuli in several ways, one of which is by altering discriminative relations. That is, CSS may establish a new relation between a response and a previously neutral stimulus, resulting in that stimulus acquiring evocative functions. In the example of the woman who rehearses privately, rehearsal alters the discriminative effect of a previously neutral stimulus—her husband voicing a suggestion that she does not agree with—by bringing her overt response of speaking up (in the manner that was privately rehearsed) under its discriminative control. That is, if the woman privately rehearses (rehearsal involving privately imagining certain responses and the probable consequences of those responses), she is more likely to emit those responses when her husband emits some behavior that she does not agree with. The rehearsal has served like a rule, indicating what behavior should be evoked by her husband's action, to yield the most favorable consequence. This conceptualization of CSS seems to be a parsimonious account of their role in influencing other behavior.

Conclusions

We have discussed several positions on how private events may be conceptualized within a behavior-analytic framework, positions that are not mutually exclusive. Although some behavior analysts (including several of the present authors) have suggested that private events might, at times, serve as discriminative stimuli directly evoking other behavior, we now suggest that a more consistent account of this role is to consider them CSS. As

mentioned earlier, our goal in this paper is to promote discussion regarding this topic rather than to provide definitive answers, and thus this position remains a hypothesis.

Research supporting the position that private events may, given the proper conditions, exert some influence over overt behavior is emerging. Taylor and O'Reilly (1997) demonstrated that both overt and covert self-instructions were functionally related to the occurrence of targeted overt behavior. As mentioned earlier, DeGrandpre et al. (1992) established that both private and public stimuli can be members of the same equivalence class. In addition to empirical work, theoretical discussions (e.g., Anderson et al., 1997; Friman, Hayes, & Wilson, 1998; Horne & Lowe, 1996) are advancing our understanding of the role of private events in a science of human behavior. Together, recent empirical and theoretical work suggests that behavior analysts are beginning to evaluate empirically how we can incorporate private events into our science. However, there is much more to be done.

The authors of this and the following three articles are all clinical behavior analysts. We rely extensively on the basic science for principles and examples that we can apply to clinical problems in order to analyze them and devise effective interventions. The examples provided above notwithstanding, the dearth of basic literature on thinking leaves us either ignoring that behavior or bravely venturing analyses that may be seriously flawed or inconsistent with a behavioral paradigm.

All of the authors of this and the next three articles in this symposium happen also to be members of the Association for Advancement of Behavior Therapy, and over the years the older of us have witnessed a sad metamorphosis in the content of that organization's conventions and publications. There has been a great increase in conceptions viewed as cognitive (Hawkins, Kashden, Hansen, & Sadd, 1992) and an increase in conceptions that are

no more scientific or behavioral than those of the layperson on the street. It is easy to be pessimistic about the future of behavior therapy, as conceived by the majority of behavior therapists (Franks, 1997; Hawkins, 1997b).

More than four decades ago, Skinner (1957) wrote, "There is no reason why methods of thinking and of the teaching of thinking cannot be analyzed and made more effective" (p. 449). What we are proposing is that behavior analysis get on with such a program of research and theory. Such efforts will benefit both basic science and applied work of all kinds, including clinical. We believe that, had behavior analysis been making greater effort at studying and conceptualizing the role of thinking in human behavior—as Skinner (1957) and Staats (1996), for example, have begun for us—more behavior therapists and other behavioral scientists would now be involved in and contributing to the cause of developing a comprehensive, integrated, natural science of behavior. As a result, that science would now be more advanced in its understanding of and ability to influence human behavior, especially the behavior of typically developed adults.

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